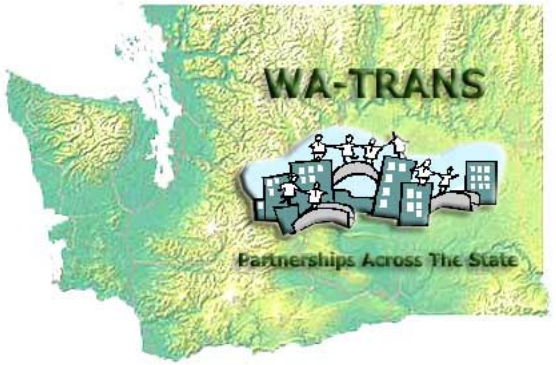


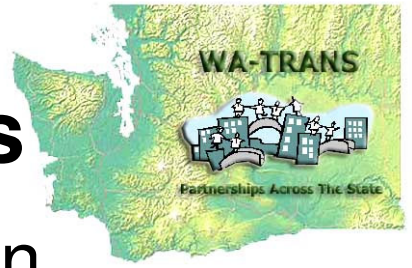
GISDC Annual Meeting
One Road TPF Study

March 29, 2006

Tami Griffin
WA-Trans Project Manager

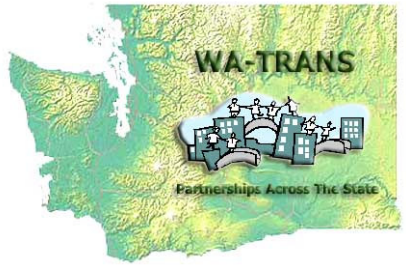
Washington State
Department of Transportation

WA-Trans Role and Responsibilities



- WA-Trans Project Manager – Tami Griffin
  - Manage WA-Trans Puget Sound Pilots
  - Oversee WA-Trans Steering Committee Work
  - Responsible for funding
  - Oversight of Pilot PM (Michael)
  - Approval of deliverables (reports, requirements, software deliverable, test plans, etc.)
  - Liaison with WA-Trans Project goals
  - Co-lead GISDC with Michael
  - Provide project management support (risk management, change management, communication)
  - Resource Coordination

WA-Trans
Roles and Responsibilities



- WA-Trans Assistant Project Manager and Technical Lead – Michael Leierer
  - Providing direct support of Puget Sound Pilot for software implementation and processes,
  - Liaison with WSDOT Data Steward in developing and implementing WA-Trans data models and databases,
  - Project Manager of the One-Road Pilot,
  - GISDC Co-lead.

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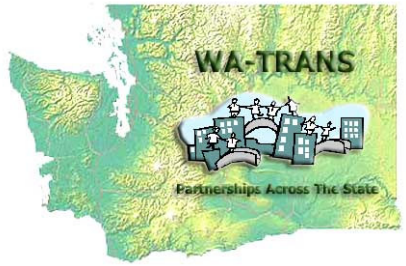
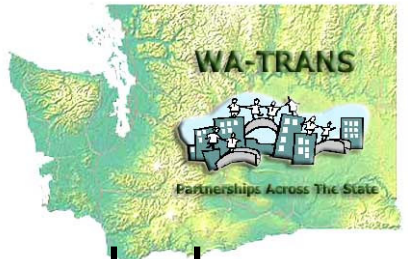
WA-Trans
Roles and Responsibilities



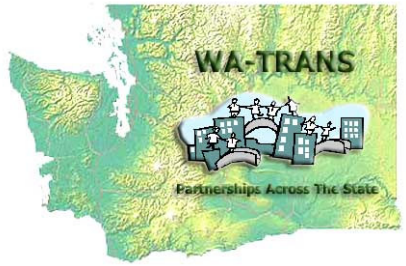
- WA-Trans Technical Writer - Ken Stallcup
  - Documenting detailed business cases for the WA-Trans Return on Investment Study,
  - Developing help files on the translation process to be available through RoboHelp on-line,
  - Documenting manual processes to provide consistency between pilots and support for requirements documentation for software development of manual processes.

WA-Trans
Roles and Responsibilities



- A new GIS Analyst position has been funded and will be hired within the next couple of months responsible for:
  - Developing (and supporting implementation of) processes to get WSDOT data into WA-Trans,
  - Providing GIS expertise in processes to be automated during the One Road Pilot (such as integration processes),
  - Providing consistency in GIS processes across all WA-Trans pilots and activities,
  - Working in support of local governments providing data to WA-Trans.

Transportation Framework (WA-Trans)



- A Statewide Transportation Database for GIS:
  - Location-based transportation data,
  - Best available data from all levels of governments and tribes,
  - Covers roads, rails, ferries, aviation, ports and non-motorized transportation infrastructure,
  - Seamless, connected, consistent and continuous data between jurisdictions, boundaries and other framework layers,
  - Useful for a wide variety of business needs.

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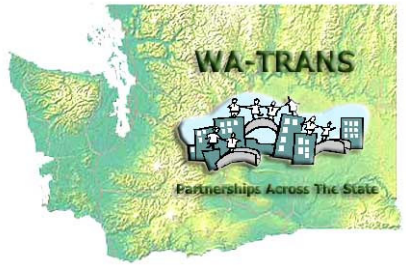
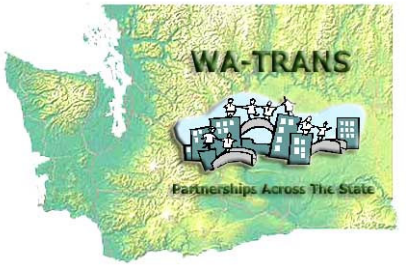
Areas of Business Needs



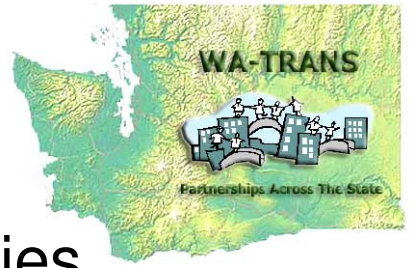
- Economic Analysis
- Emergency Management
- Emergency Response
- Environmental Assessment
- Forest Roads Management
- Forest Fire Planning & Response
- Homeland Security
- Inter-jurisdictional Communication
- Law Enforcement
- Public Transportation
- Social Services
- Supporting Federal Initiatives (e.g., The National Map, Bureau of Census Tiger/MAF Modernization)
- Transportation Planning
- Transportation Maintenance
- Traffic Safety
- Tribal Treaty Rights
- Etc. . .

Project Organization



- WSDOT Facilitated.
- Partnerships with counties, cities, MPOs & RTPOs, tribal nations, transit organizations, freight, federal agencies, and private organizations.
- Steering committee – decision makers, representatives from different levels and disciplines of government.

Who Is Working On This?



- WSDOT – lead
- 11 State agencies
- Freight interests
- 4 Regional planning offices
- 23 Counties
- 7 Federal Agencies
- 10 Cities
- 9 Tribes
- 3 Transit Organizations
- & more!

Steering Committee: WSDOT, Fish and Wildlife, Freight Interests, PSRC, E-911, 4 Counties, 2 tribes, Community Transit, US Bureau of Census and USGS.

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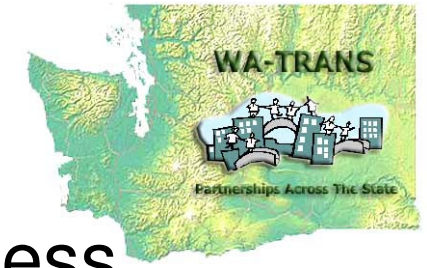
Project Steps



- Initiation – Outreach, Chartering, Business Needs Assessment and Prioritization;
- Analysis – Data model, standards, tool definition, architecture, scoping, pilot definition, initial funding;
- Pilot Projects – Test and prove concept, software prototyping, risk mitigation;
- Implementation – Building it statewide;
- Maintenance – Continuing to get the best data and improve the quality of the data and access to the data.

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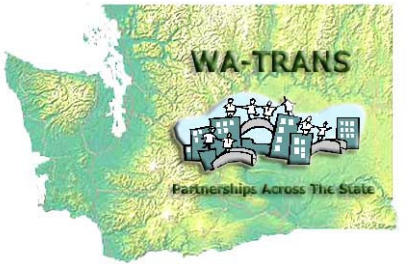
Work Completed So Far



- Business Needs Assessment,
- Return on Investment (in progress),
- Data Model and Standards,
- Conceptual Architecture,
- Translator Requirements,
- Translator Test Implementation,
- Database Test Implementations,
- Two Pilots in Progress

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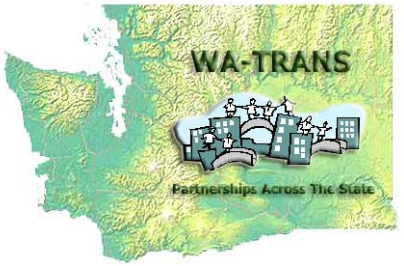
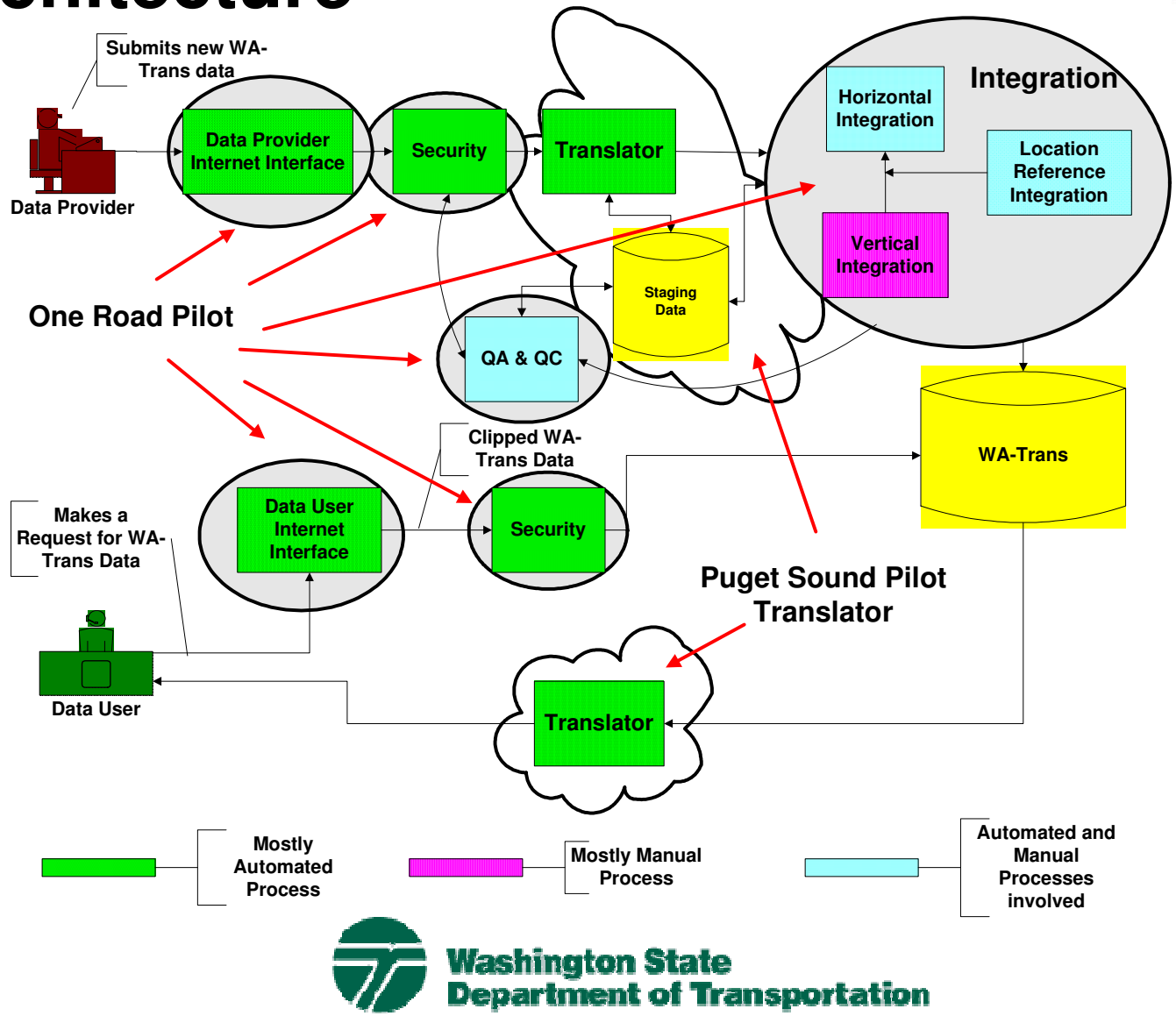
WA-Trans Conceptual Architecture





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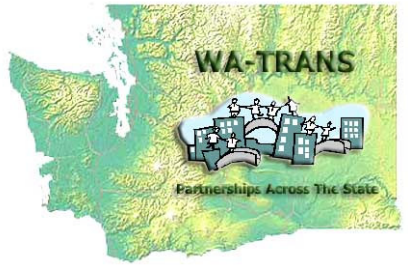
Major Components of WA-Trans Architecture



- Translators – Bringing data into and out of the system so the data providers and users don't have to change their data formats.
- Integration Software – Creating "seamless" representation of linear transportation features and making sure all necessary information is there. Integrating LRS is also needed.
- Quality Assurance/Quality Control – Providing tools and processes to evaluate data to make sure it is accurate and complete.
- Processes and Agreements – the glue that holds it all together!

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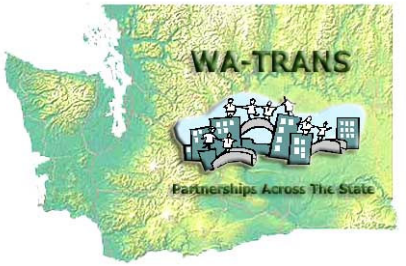
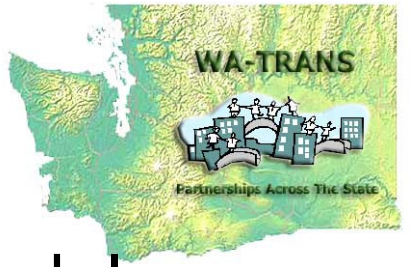
Scope of Data Model



- WA-Trans Data Model and Standards include:
  - Roads,
  - Rail,
  - Ferries,
  - Aviation,
  - Non-motorized Transportation,
  - Marine and River Ports will be added.

History of Data Model



- Initially based on Oregon All-Roads model.
- Due to business needs in transportation planning, emergency management and economic development, the model had to be multi-modal.
- Worked with WSDOT Rail, WSDOT Aviation, WA State Ferries, and WA-Trans Steering Committee to develop current design.
- Federal standards created by FGDC have been used as a basis for this model.

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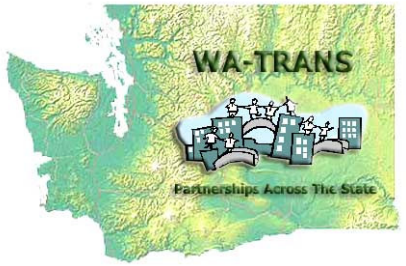
Data Model (Conceptual View)

Segment Point Model



Segments – represent roads, ferry routes and staging area, rails, bike routes, bus-only routes, HOV, non-motorized, aviation runway.

Points – segment begin and end, intersections, changes in ownership and terminals, such as ferry or aviation terminals.

Events – Various core attributes are included. Some of this will be part of the core data structure, but much of it will be event-based to minimize need for segmentation of routes.

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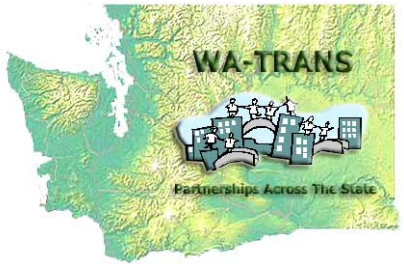
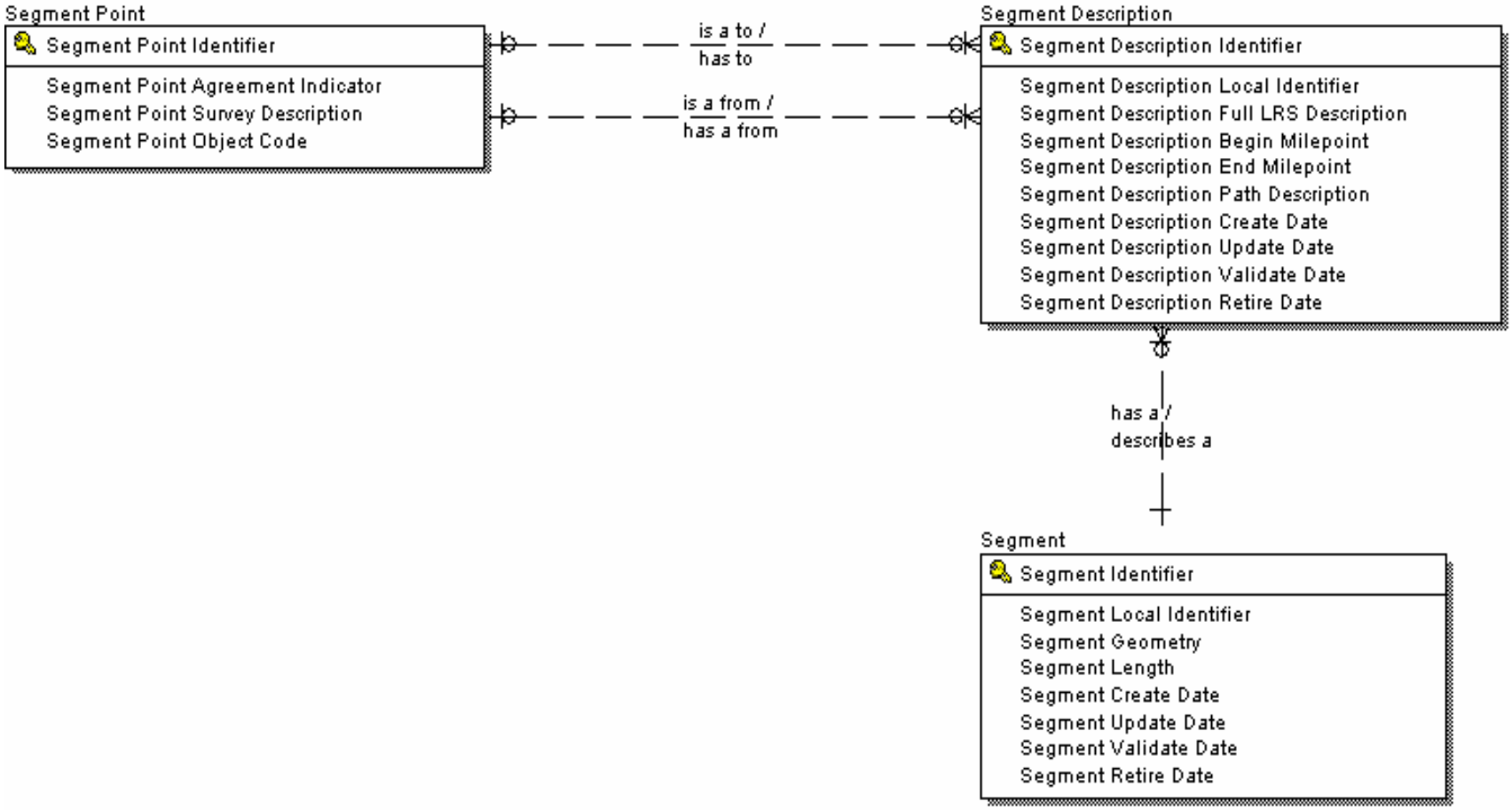
WA-Trans Data Model





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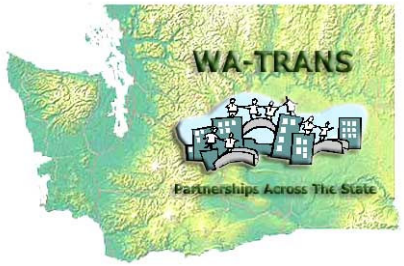
Segments and Points – A Conceptual View



City Limits

From Node

25-0001

25-0002

25-0003

25-0004

25-0005

25-0006

25-0007

19-0999

To Node

Segment ID (FIPS County - Sequential Number)

Anchor Point (From Node-To Node)

Secondary Node

State Highway

County Road

City Street

Forest Road

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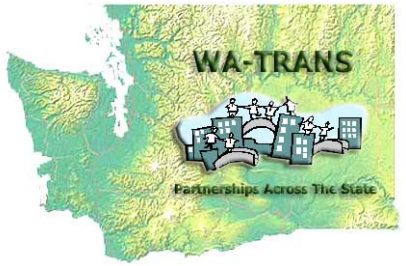
Characteristics of Segments and Points



- Multiple descriptions are allowed of segments. This supports different names by different levels of government for the same feature,
- Segment and point identifiers are perpetual. They are retired when the infrastructure changes so we can historically reproduce that feature at any specific date,
- Descriptions are also perpetual and can retire independent of segments and points,
- Dates of interest: create, update, validate, retire.

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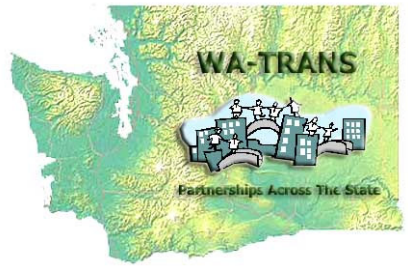
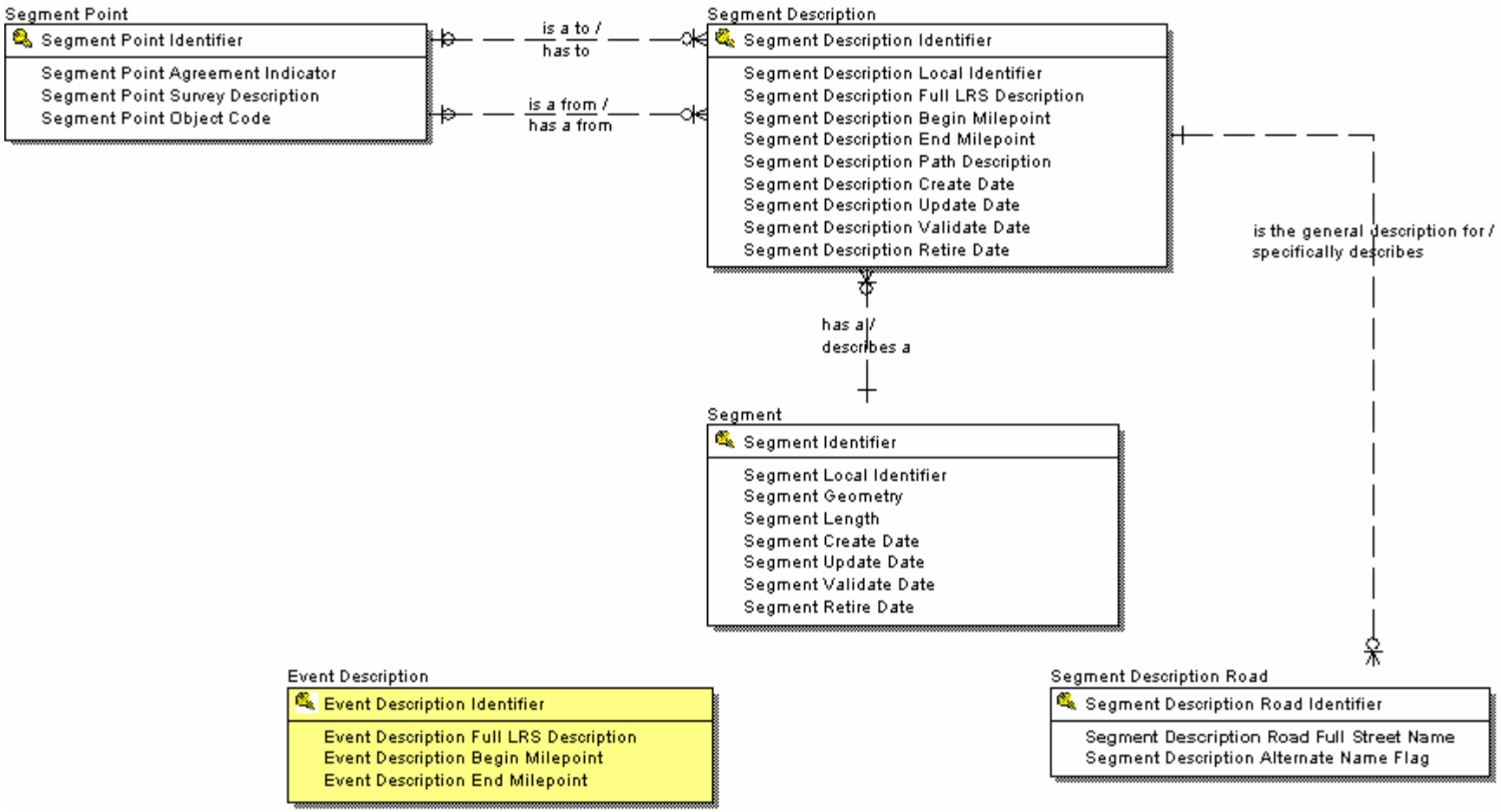
WA-Trans Data Model





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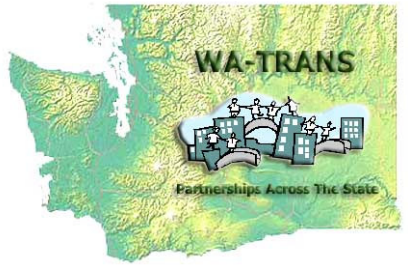
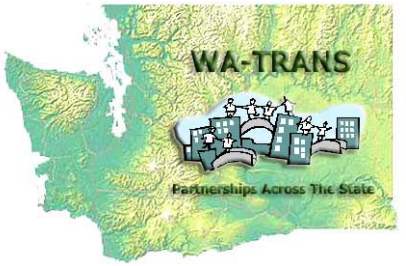
Linear Reference Systems



- LRS supported explicitly:
  - Route milepost (used by Fed, State and County),
  - Addresses (used by County and City and some State and Fed).
- LRS supported implicitly:
  - Distance from intersection (used by City).

Event Data



- Event data for roads includes:
  - Surface Information,
  - HOV Information,
  - Speed Limits,
  - Number of Lanes,
  - Federal Functional Classification, (with crosswalks)
  - Structures,
  - Non-motorized use,
  - Average Daily Traffic,
  - Indian reservation road information,
  - Freight and Goods to be added.

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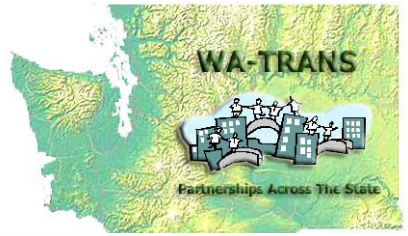
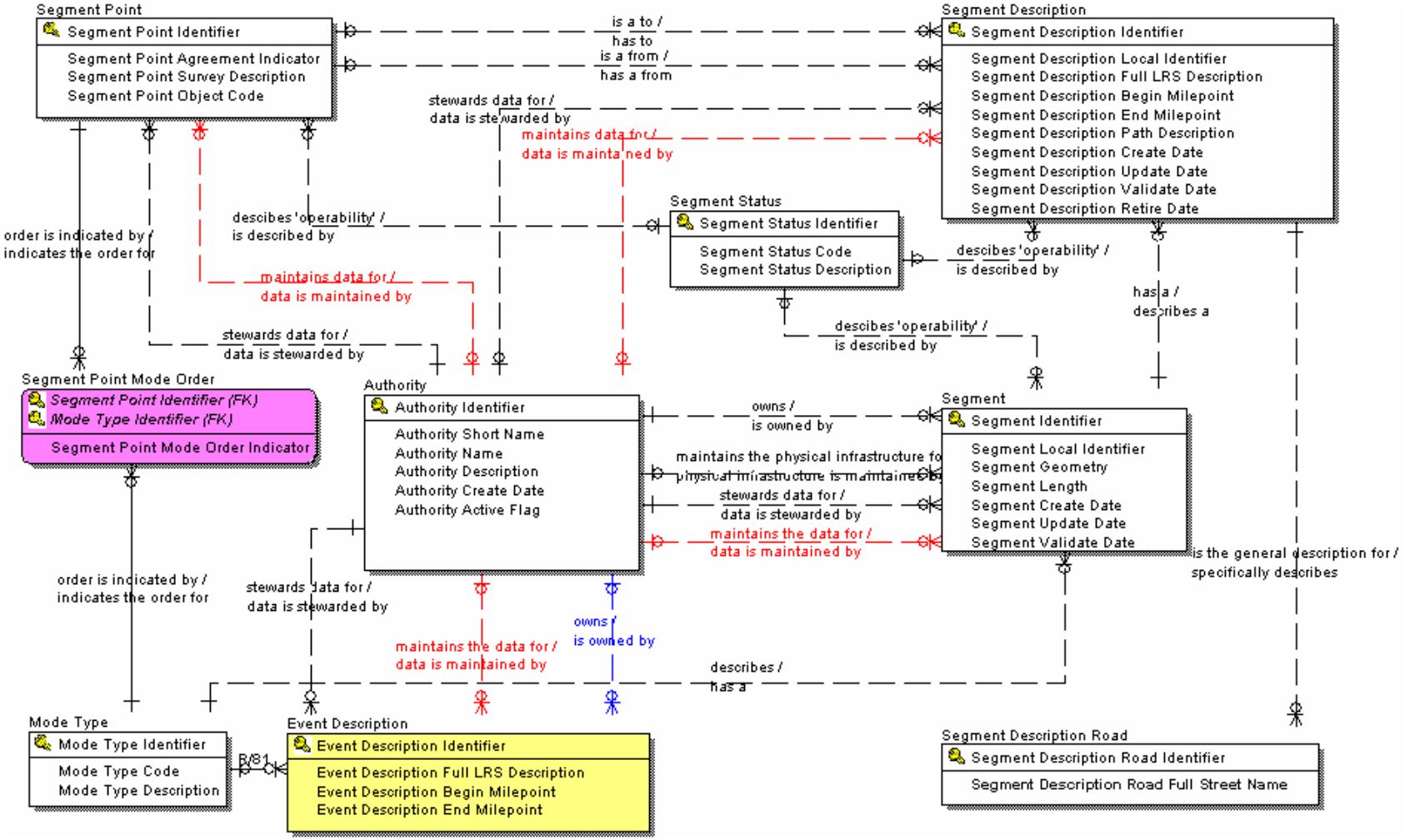
WA-Trans Data Model





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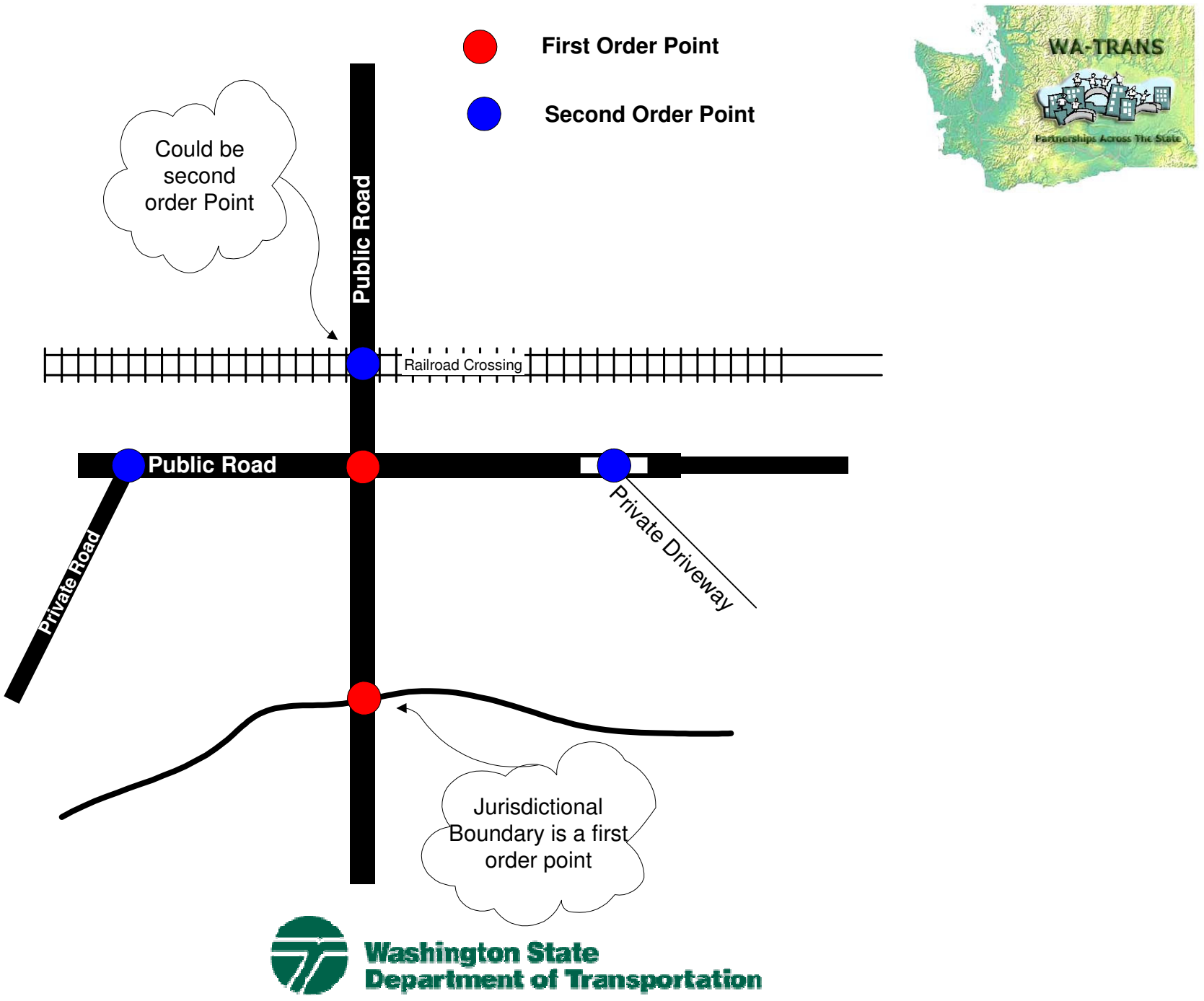
First Order Point
Second Order Point
Could be second order Point
Public Road
Railroad Crossing
Public Road
Private Road
Private Driveway
Jurisdictional Boundary is a first order point
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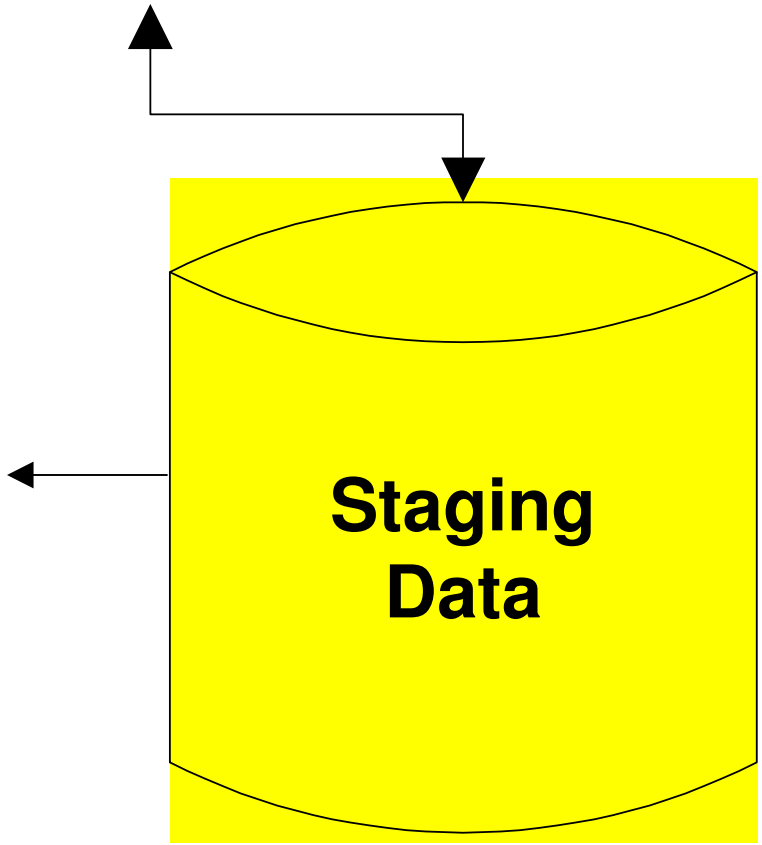
WA-Trans Staging Database



- A geo-database with versioning,
- Where manual and automated data manipulation occurs in preparation of putting data into WA-Trans (ex. Re-segmenting of data, documenting agreement points, adding WA-Trans dates), etc.

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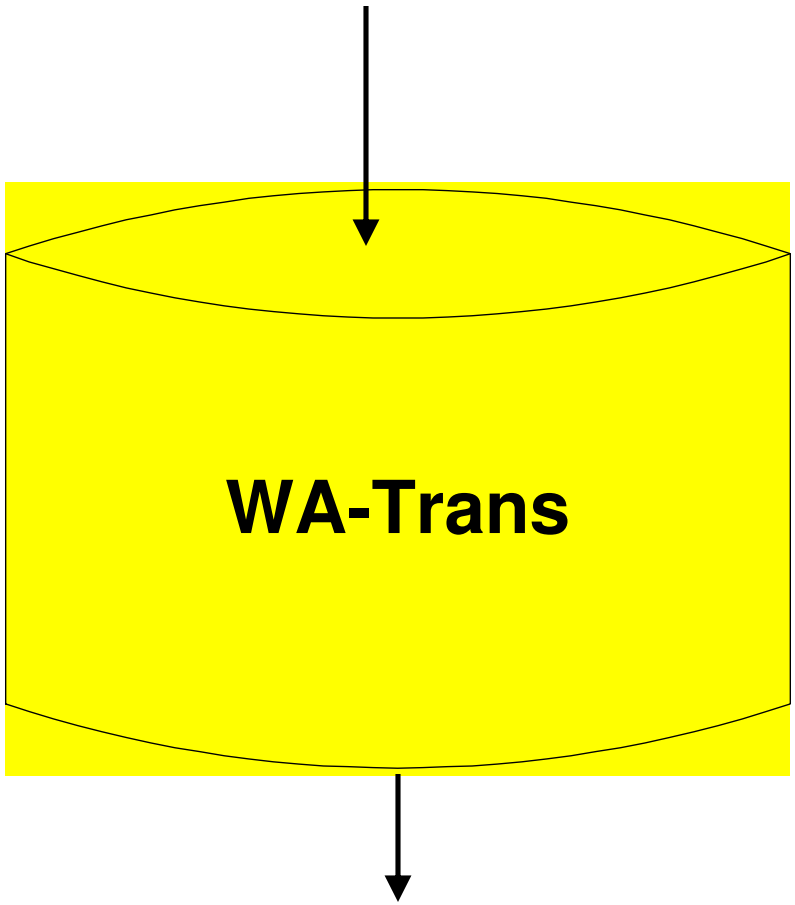
WA-Trans Database



- WA-Trans will be registered with a geo-database.
- This will facilitate use with tools for spatial data work.
- SQL format is still available.

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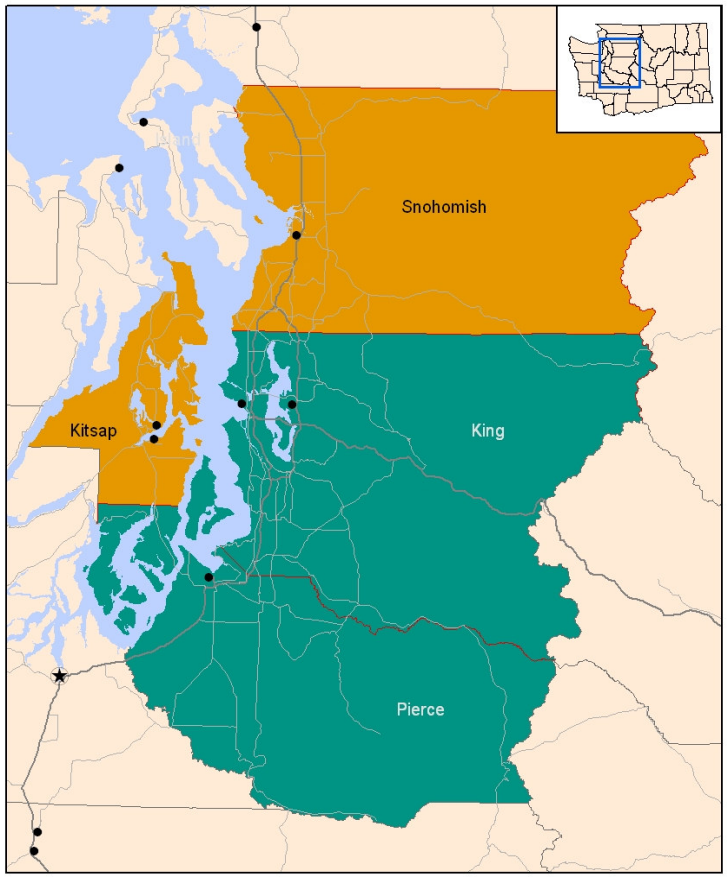
Puget Sound Pilot Phase I and II



USGS CAP Funding Phase I

Proposed Funding Phase II

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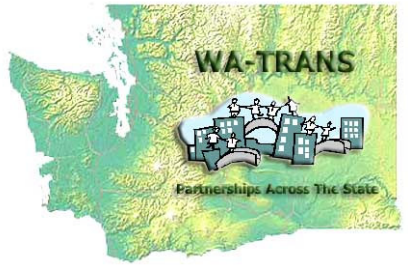
Puget Sound Pilot Plan Overview



- Phase I funded by NSDI CAP Grant.
- Partners include Pierce and King County and others who may wish to share data.
- Puget Sound Regional Council will perform GIS work.
- Translator is being tested by Pierce County, King County and Puget Sound Regional Council.
- Data will be provided to The National Map served by the USGS.
- WSDOT data will be added over time.
- Testing of final data product will be with a regional transit provider and PSAP.

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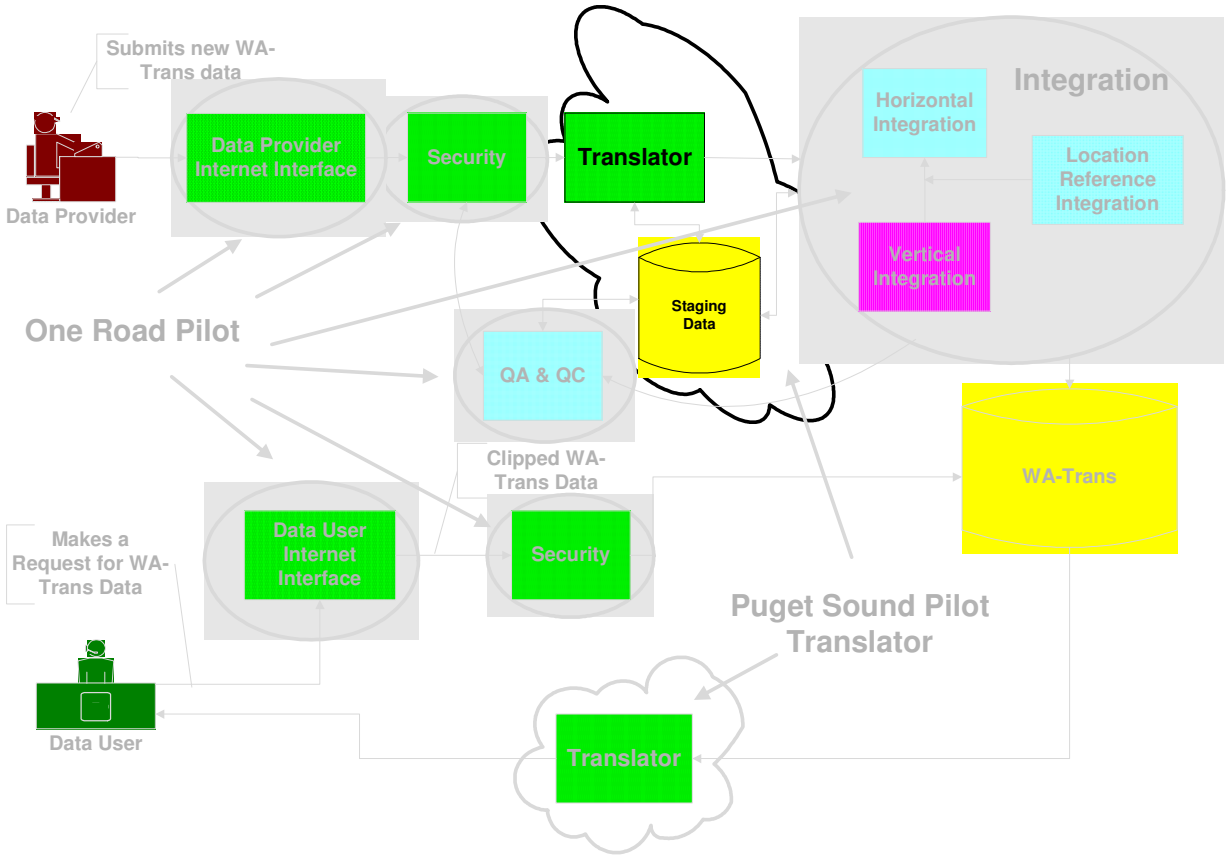
Translator Conceptual Architecture



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Puget Sound Pilot Milestones

- Agreement Points have been defined between Pierce and King County,
- Purchased a copy of the ESRI Data Interoperability Extension,
- Completed training (for King and Pierce Counties, Puget Sound Regional Council and WSDOT on the Data Interoperability Extension.
- Completed design and implementation of simplified dataset for data providers to work with,
- Made sure data providers have access to WSDOT environment for translation during the pilot,
- Developed the WA-Trans side of the translator,
- Implemented the WA-Trans database and tested it with WSDOT and GDT data.

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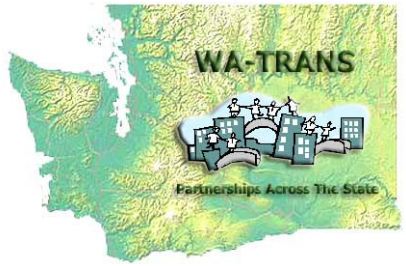
Puget Sound Pilot
(Agreement Points)



- Pierce County has been leading the effort to establish agreement points, first with King County (very nearly complete) and then with all surrounding counties.
- Letters were written about agreement points to all surrounding counties explaining agreement points and soliciting involvement in the process.
- Two major issues have been highlighted:
  - Boundary layer issues (discussed at the last meeting),
  - King County maps driveways, Pierce does not. Second order points will facilitate that.
- We are beginning work on the process to document these points in WA-Trans.

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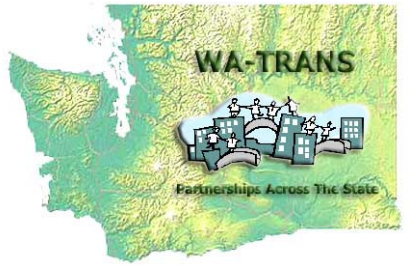
Puget Sound Pilot Next Steps . . .



- Complete data user side of translation process,
- Complete translator help files,
- Get King and Pierce County data translated in,
- Work with Puget Sound Regional Council to document QA/QC processes,
- Test Staging Database,
- Provide data to The National Map,
- Provide data to other groups wanting to test the results,
- Begin process to put WSDOT data into WA-Trans,
- Find funding for Phase II.

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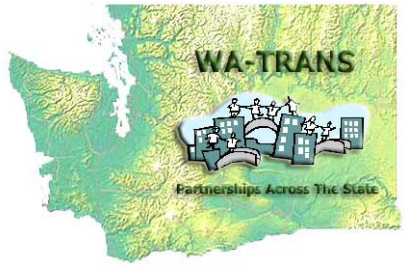
One Road Milestones



- Project Charter has been completed.
- Nebraska, Oregon, Ohio and Tennessee DOTs have committed to joining. California and others are considering involvement.
- A solicitation for July, 2006 has been posted recently, looking for new partners.
- Annual Advisory Team Meeting is occurring as we speak!

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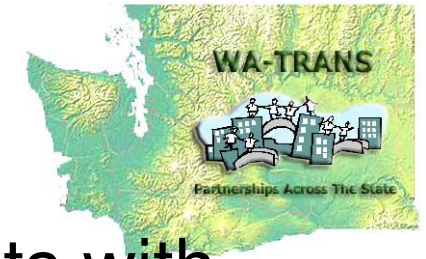
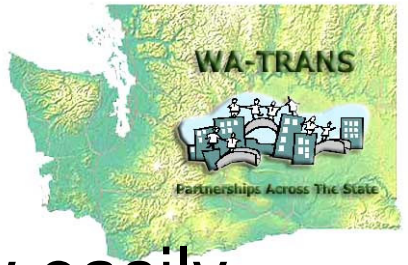
One Road Activities



- We are working to develop agreements with universities for some of this work. WSU has expressed interest in providing GIS work.
- We are also trying to figure out how private partnerships would work. Interest has been expressed by several companies.
- We are documenting processes which will lead to requirements for integration and user interfaces.

Phase I and II (July ’05 – June ’07)



- Continue to work on translators and how easily additional software can be interfaced with them,
- Develop requirements for the two user interfaces,
- Develop requirements for Integration,
- Look at existing software solutions and research,
- Develop integration software (iteratively).
- Test the results of the software with various pilots.
- We will do as much as we have funding and resources to do.

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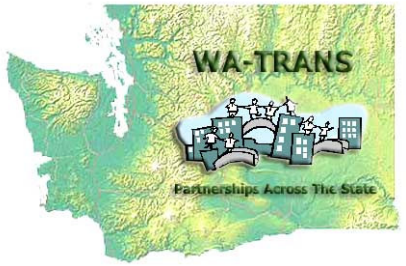
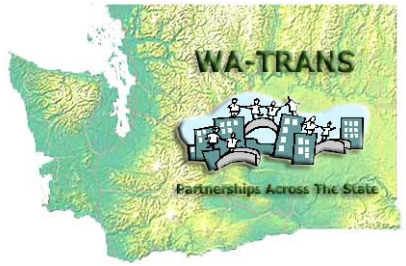
Phase III and IV (July ’07 – Complete)



- Complete integration software.
- Develop requirements for QA/QC software,
- Research existing solutions for QA/QC software,
- Develop QA/QC software.
- Begin looking at security required in some detail and public/private data issues.
- Security will likely be purchased or part of existing systems.
- Develop requirements for linear referencing integration and follow the rest of the process out.

No Data Pilot



- Exploration for how we deal with a jurisdiction with no data,
- Goal: to set up a jurisdiction with GIS, focusing on transportation in return for data updates,
- Determine possible sources of the initial dataset (TIGER/MAF Modernized Data, other sources?),
- Determine how to get long enough term commitment to ensure the jurisdiction as a viable data source,
- Strategy for those jurisdictions that won't be a data source ever,
- Steering Committee is working on this.

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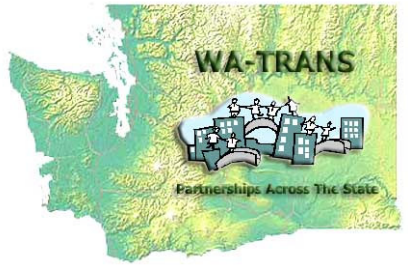
Justifying Costs of WA-Trans



- FGDC and GITA sponsored a case study on return on investment for a multi-agency GIS project. WA-Trans was selected for this study. They came in mid-November and trained and worked with us to determine business case for transportation planning and WA-Trans.
- The study was only focused on Transportation Planning. We have only collected a small percentage of the business benefits so far (and these only in WSDOT).

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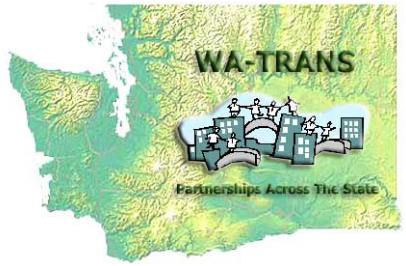
WA-Trans ROI Process



- Within WSDOT we still need to look at:
  - Transportation Data Office (Roadway & Travel Analysis Branches),
  - Freight Strategies and Policies,
  - Planning Office,
  - Cartography and GIS (data collected),
  - Incident Response,
  - Public Transportation,
  - Highways and local programs,
  - Others not yet identified.

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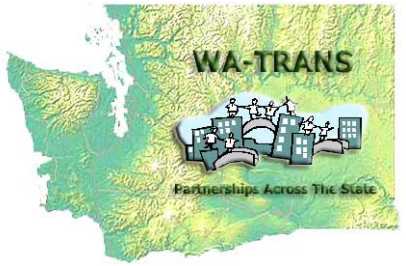
WA-Trans ROI Process



- We plan to perform a strategic analysis that quantifies benefits outside WSDOT as well. We have several candidates identified:
  - MPOs and RTPOs
  - WA Dept. of Fish and Wildlife,
  - WA Dept. of Revenue,
  - WA Dept. of Corrections,
  - WA Dept. of Social & Health Services
  - WA Dept. of Military,
  - WA Utilities and Transportation Commission,
  - Various Local Governments. . .

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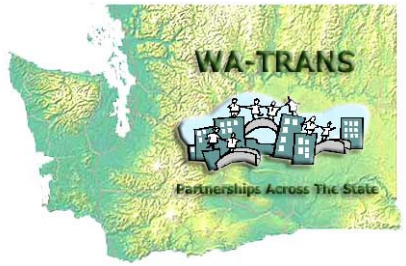
WA-Trans ROI Results (so far)



- Assuming a very conservative development schedule we were able to show enough benefits to **recoup half our costs** over a 20 year period with just what we have collected so far.
- Assumed a development schedule of implementation in mid-2010.
- Assumed small piecemeal funding until all pilots complete and minimal overlap between them.

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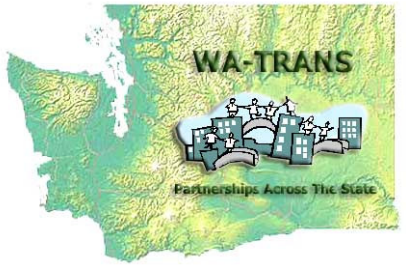

Contact Information:

- Project Manager:
- Tami Griffin
- (360) 709-5513
- Griffit@wsdot.wa.gov

- Assistant Project Manager and Technical Lead:
- Michael Leierer
- (360) 709-5511
- LeiereM@wsdot.wa.gov

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